AFFIDAVIT

BY

BILLY R. CLAY MS, DVM, DABVT

FOR

The Defendants in the:

PRELIMINARY INJUNCTION
STATE OF OKLAHOMA, et al. V. TYSON FOODS, INC., et al., CASE NO. 05-CV-0329 GKF-SAJ. IN THE U.S. DISTRICT COURT, NORTHERN DISTRICT OF OKLAHOMA

JANUARY 31, 2008

Billy R. Clay MS, DVM, DABVT

Feb 5, 2008

AFFIDAVIT

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RATE: **$190/hour plus expenses**

RESERVATION: **In the event that new information should become available, I reserve the right to modify these opinions and related discussion accordingly.**

AFFIDAVIT OF DR. BILLY R. CLAY

I. BACKGROUND

The Illinois River Watershed (IRW) has been a point of contention between the states of Oklahoma and Arkansas since the river was designated as a Scenic River by Oklahoma in 1969. There have been numerous agreements and disagreements since that date--all related to the quality of water flowing into Tenkiller Ferry Reservoir. The focus has been on the "ballooning" population of people and the agricultural production required to sustain them. The current issue is focused on the poultry industry as if it were the only potential source of impairment for the river while excluding numerous other sources. A motion for injunction has been filed by the state of Oklahoma to stop all application of poultry litter fertilizer to farmland of the watershed. The claim is that suddenly (after more than 50 years) that application poses a threat due to bacteria from poultry manure that might enter the river where people play during the summer months.

II. OPINIONS

1. Poultry litter like other livestock manures and beddings has a long history of safe usage as an important source of fertilizer for human food production.

2. There are a variety of benefits associated with the use of poultry litter fertilizer and its application is highly regulated in the IRW.

3. Poultry litter production estimates by plaintiff's experts are in conflict with other sources.

4. There are numerous sources of animal and human fecal material and its associated bacteria in this watershed.

III. BASIS AND REASONS FOR EACH OPINION

A CHARACTERIZATION OF POULTRY LITTER

(Opinions 1-2)

Poultry litter is a mixture of organic material (wood, crop residues, etc.), the collected excrement, spilled feed, feathers and any amendments that a producer chooses to add. The duration of a typical litter cycle is 1 to 2 years. In the case of broiler production new organic material (wood shavings, etc.) is applied to the cleaned and disinfected floor of a chicken house which will house about 20,000 broilers. New broiler chicks are added to the environmentally controlled barn where they will grow and develop over a period of six to seven weeks. During that time at least three different ration formulations will be provided that become a part of the excrement, etc. that is deposited on and in the litter. The litter serves as an insulating absorbent and adsorbent medium to help keep the chickens dry and comfortable. Because the chickens tend to congregate near feed troughs and water dispensers, that area of the litter may become caked by week six.

When the broilers are removed the farm manager will de-cake the litter and add a thin surface layer of fresh organic material prior to the next group of chickens. This process is continued for five to several turns of broilers and the house is then thoroughly cleaned and disinfected.

Breeder, layer and turkey production involves different production cycles but where litter is used on the floors similar processes may follow resulting in a varying constituency of the end product at the time of cleaning of the houses.

The litter cake and litter may be stored or applied directly to agricultural land according to a nutrient management plan that each farmer must adhere to. Most is applied at or near the time of removal from the poultry house but not necessarily on the same fields annually. Not all the litter produced on a particular farm will be applied to that farmer's land. Some will be sold to other farmers or business entities in the area or shipped outside the area. Many poultry producers do not have farm or pasture land, therefore their litter is sold or bartered to others who must also apply it according the regulations of the respective states. There are laws in place in both Oklahoma and Arkansas to adequately regulate the disposition of poultry litter. The guidelines set forth will identify parcels of land that should not have additional poultry litter applied but those are in the minority.

HISTORY AND VALUE

Animal bedding with excrement fertilizer is not unique to the poultry industry. As long ago as 300 BC Theophrastus recognized and recommended the use of animal bedding as further enrichment for the soil. In that period the focus was on

donkeys, sheep, goats and cattle. Similar recordings were made in China over 2,000 years ago. The Greeks perfected the use of such fertilizers in their soils and the Romans adopted their practices. In fact some of the Roman intellectuals took the collection of fertilizer to another level by digging pits near farm buildings for systematic collection of various wastes including animal, fowl and human along with leaves, vegetables and virtually all other organic materials they could find. In the 16th and 17th centuries manure with bedding fertilizer was traded as commercial fertilizer is today. Much of the transportation for trade was by seagoing vessel requiring special storage to minimize added moisture that could accelerate fermentation.

Mineral fertilizer amendments were discovered and began to be used during that same period. The extensive experimentation and utilization of mineral fertilizers that followed paved the way for an expanding population and the concentration of populations within cities. However their use did not replace organic fertilizers such as poultry litter. Additional experimentation served to demonstrate the augmentation value of organic and inorganic mineral additions for prolific plant growth.

Today we continue to use animal manure fertilizers wherever they are available. The composition of manures vary with animal species, feed source, and type of bedding used. Broiler litter typically contains 65 to 75 pounds of nitrogen per ton, 60 to 80 pounds of phosphate, 40 to 50 pounds of potash and 40 to 60 pounds of calcium. It will also contain about 20 to 35 percent moisture and measurable quantities of magnesium, sulfur, sodium, chloride, iron manganese, boron, zinc, copper and other micronutrients, as well as, any additives provided in the feed or added to the litter. Its value based on nutrient content alone is in the range of $25 to $40 per ton. The added intrinsic value of litter is that the decaying organic matter adds water holding capacity to the soil and the nutrients are more slowly released as the material decays during the growing seasons. The added water holding capacity allows crop plants to survive during periods of low rainfall and flourish during periods of adequate rainfall. The responsive growth of vegetation serves well to minimize erosion of sloping surface soils similar to those in the Illinois River Watershed.

Commercial inorganic fertilizers tend to be acidifying to soils. This is an undesirable trait in soils typical of the IRW. Those soils are acid prone and require the addition of lime periodically for maximum production. Poultry litter does not contribute in the same way to the acidity and it provides the additional intrinsic calcium and magnesium to further aid in acid neutralization. Cultivated crop land can make use of the nutrients and amendments of poultry litter at a more rapid rate due to incorporation into the topsoil. This practice provides an enhanced microbiological decay of the organic materials releasing the nutrients for plant uptake.

POULTRY LITTER PRODUCTION ESTIMATES BY PLAINTIFF'S EXPERTS ARE IN CONFLICT WITH OTHER SOURCES (Opinion 3)

Litter as described in earlier sections is not all excrement but excrement and other materials dropped onto an organic matrix placed in the poultry house before poultry are added. In the case of broilers (the predominant production in the IRW), additional organic matrix is placed on top after each production cycle. The combined organic material with spilled water may represent 25 to 50 percent of the total weight of the harvested litter. Each ton of litter represents about 1,000 to 1,500 pounds of excrement, spilled feed etc.

Calculations by plaintiff's experts suggest that 347,000 tons of litter are produced and applied to soils within the IRW each year. The statement was made that 80 percent was applied within 5 miles of the farm. All the calculations and source materials were not available at the time of this document preparation, therefore, the information will be addressed using data from other documented sources.

If one were to accept that 347,000 tons represents an accurate assessment and 80 percent is applied within 5 miles of the poultry farm then calculations may be made to reflect the application rate. For a typical farm (4.5 houses) five miles in any direction represents 100 sections, or 64,000 acres for potential application. Using the Oklahoma Department of Agriculture, Food and Forestry (ODAFF) average litter production per house of 120 tons, then 540 tons could potentially be applied over 64,000 acres (17 pounds/acre). Of course there will be other production units within the 100 sections to make their respective contributions and all the land is not farm land. The point to be made is that there is a large area of land to make use of the litter produced. My calculations from census data show that there are 698, 525 acres of farm land within the IRW.

From the point of view of 120 tons per house, then 347,000 tons would represent 723 poultry farms, or 3,253 houses within the IRW. Other sources of house estimates have placed the number of active houses much less than 3,253.

Dr. Dan Storm from Oklahoma State University reported to the Oklahoma Department of Environmental Quality in 2006 that 230,000 tons of poultry litter is produced in the IRW annually. He used county assessor records to make those calculations.

Sherri Herron with Best Management Practices, Inc has provided data on tons of litter that she has arranged for and exported out of the IRW. For the years of 2005/06 and 2006/07 from September to August she reported 52,000 and 72,000 tons. She has projected that 90,000 tons will be exported in 2007/08. It appears that the Plaintiff's experts may have over estimated production and may not have taken into account the litter exported when calculating the litter applied. Likewise, the calculations do not show the poultry manure versus litter estimates—an important number when estimating fecal bacteria.

ANIMAL AND HUMAN MANURE WITH ITS ASSOCIATED BACTERIA IS ABUNDANT FROM A VARIETY OF SOURCES IN THE IRW

Opinion 4

In the IRW Basin Management Plan an estimate of greater than 40 percent of the non-point source nutrients was from manure of grazing livestock. Other references were made of point source contributions from public treatment facilities and septic systems. There are approximately 250,000 people in the watershed and 75,000 rely on rural septic systems. The nutrients in those cases are of human and domestic animal fecal origin. All animal feces (including human) contain bacteria and other microbes. Most of the microbes are beneficial to the respective species where they reside.

In an effort to characterize the non-point sources of animal manure (other than poultry) in the watershed the 2002 National Agricultural Statistics Service census data was examined at the zip code level. Using the USDA Agricultural Waste Management Handbook and other related publications the annual production of manure was calculated along with an estimate of the fecal coliforms in that manure. Other sources (see references below) were used to make wildlife estimates as well. The data are shown below:

Animal Group	Number	Annual Manure Wet Tons	Fecal Coliforms X 10^{10} CFU
Beef Cows	103,737	1,177,747	124,950,746
Milk Cows	10,829	194,407	7,362,665
Other Cattle	85,019	916,994	102,405,463
Hogs and Pigs	149,393	112,148	53,342,847
Sheep and Lambs	1,930	14,087	845,217
Horses and Ponies	8,194	74,770	125,614
Whitetail Deer	29,400	214,211	12,852,672
Wild Turkey	3,564	12,984	331,452
Geese (Days)	128,500	48	10,269
Duck (years)	662	40	58,685

The total tons of non-poultry animal manure in the watershed was estimated to be 2,717,436 wet tons with fecal coliforms of 302,285,630 X 10^{10} colony forming units (3.02E+18).

The calculations do not include the variety of other animals in the IRW in which there are limited data available to characterize the fecal and coliform out put. One can make estimates based on body weight using known data from selected members of the animal Classes (birds, mammals etc.). Since these are estimates without the luxury of verified data they will be shown below for the purpose of providing information as to the variety of additional vertebrates that live or visit the IRW throughout a given year.

WILDLIFE KNOWN TO EXIST WITHIN OR VISIT THE ILLINOIS RIVER WATERSHED

Sources: Arkansas Game and Fish Commission
Oklahoma Department of Wildlife Conservation
Wedington Wildlife Management Area
White Rock Wildlife Management Area
Cherokee Wildlife Management Area
Cookson Wildlife Management Area
Tenkiller Wildlife Management Area
Sparrow Hawk Wildlife Management Area
Sequoyah National Wildlife Refuge
The Audubon Society Field Guide to North American Birds
Cornell Lab of Ornithology-Guide to Birds
Virginia Depart.of Environmental Quality—Fecal Coliforms for TMDL

Fecal Coliform Estimates/Head/Day X 10^6 CFU
Based on Body Weight Comparators within Class

Water or Marsh Birds (No. of species)		Forrest and/or Meadow Birds	
Geese (3)	799	Crow	200
Ducks (15)	2,430	Hawks (3)	240
Heron (2)	850	GH Owl	560
Cormorant	850	Barred Owl	320
Bald Eagle	1,600	BW Quail	70
Grebe	480	Pileated Woodpecker	80
Merganser	2,430	Screech owl	80
Coot	1,700	Grackle	50
Egret	180	Killdeer	40
Bittern	180	Meadow Lark	40
Marsh Hawk	240	Jay	35
Vulture	640	Night Hawk	30
Gallinule	130	Hairy Woodpecker	30
Rail	130	Redbellied Woodp.	30

Kingfisher	70
Snipe	65
Woodcock	80
Bank Swallow	20
Red-winged BB	20
SP Plover	17
Water Thrush	8
Swamp Spar.	8
Will. Flycatcher	5
Alder FC	5
Marsh Wren	5

Starling	30
Robin	27
Whip-poor-will	22
Mockingbird	20
Blackbilled Cuckoo	20
Eastern Kingbird	18
Loggerheaded Shrike	17
Veery Thrush	15
Scissortail FC	15
Cowbird	15
Cardinal	15

Mammals, Reptiles and Amphibians

Elk	12,000
WT Deer	347
Raccoon	113
Armadillo	80
Coyote	990
Foxes (2)	500
Bobcat	450
Raccoon	113
Skunks (2)	80
Opossum	80
Mink	60
Musk Rat	25
River Otter	25
Rabbit (2)	20
Squirrel (2)	5
Rodents (?)	5
Turtles (?)	?
Tortoises	?
Snakes (?)	?
Frogs (?)	?
Tree Frogs (?)	?
Lizards (?)	?
Skinks (?)	?

Forrest and Meadow Birds Cont.

Grosbeak	15
Towhee	15
Bobolink	15
Thrushes (3)	15
Eastern Bluebird	10
Sparrows (6)	10
Hermit Thrush	10
Downy Woodpecker	10
Junco	8
Grasshopper Sparrow	7
Tufted Titmouse	7
Eastern Phoebe	7
Field Sparrow	5
Goldfinches	5
Buntings (2)	5
YB Flycatcher	5
Warbling Vireo	5
Eastern Pewee	5
Least Flycatcher	5
Warblers (4)	3
Chickadee	3
American Redstart	3
Kinglet	3
Hummingbirds (2)	2

Wild Turkey	93
Pigeon	70
Mourning Dove	40

Fecal coliforms represent a combination of organisms that exist naturally in the feces of most vertabrates and some invertabrates. Some are free-living (outside the hosts). The most well recognized of the fecal coliforms is *Escherichia coli* (E. coli) and it is almost

always found in the digestive tract and in sewage and manure of various origins. It does not become free-living in the outside world but several of the coliforms can (Aerobacter, Klebsiella etc.). E. coli does have strains of the organism that have been pathogenic to people (0157H is an example). The 0157 strain is not typically found in birds but in mammals. Other well-recognized members of the group include the Salmonella and Campylobacter species. Some of these species may be pathogenic to others outside the host species when transferred incidentally. Other fecal bacteria include the Streptococcus group (enterococcus). These have a shorter life span outside the host organism but when discovered in waters, or other surroundings, may indicate fecal pollution. In a study at the University of Tennessee J. Mundt recorded the incidence of enterococci in wildlife. He found the organisms in 71 percent of 216 mammals, 86 percent of 70 reptiles, and 32 percent of 22 birds. The enterococci are common inhabitants of the digestive tracts of domestic animals, birds and wildlife.

Fecal pollution is a common occurrence in nature. The amount of fecal pollution is used as an indicator of risk of infection by the EPA. The indicators do not establish the probable risk until known pathogens in sufficient concentrations are found along with the indicators.

ANIMAL AND HUMAN POPULATION GROWTH IN THE IRW AND ITS RELATIONSHIP TO FECAL EXPOSURE

The plaintiff's experts have emphasized the rapid growth of the poultry industry using individual head count compared to other livestock and humans to make the case that the greatest source of animal manure for human exposure to fecal coliforms is poultry. If that comparison is to be made legitimately then the comparison should be made on a body weight basis (100 or 1,000 pounds of each species compared). Manure production is proportional to body weight in each species. In order to make those measurements accurately over time one must take into account the average size of each animal during its stay in the watershed. For example the average live market weight of a broiler in 1950 was 3.08 pounds and in 2000 it was 5.02 pounds. The average stay of that broiler in 1950 was 10 weeks while in 2000 it was 6.6 weeks. The average adult human weight has increased 25 pounds in that time. The average beef cow and her weaned calf have increased 200 pounds in that time.

When examining the likelihood of exposure one must take into consideration not only the production and amount of feces but the habits of the animals (including people) and the location of the manure relative to the streams within the watershed. Aside from point source placement from water treatment plants, the grazing animals and wildlife offer the greatest threat to deposition within the waters. Cattle tend to lounge in the riparian or timbered areas or around their water supply. It is during lounging that a substantial production of fecal material occurs. If they have direct access to streams then cattle can become a point source. A study in California (UC Fact Sheet 25) showed that cattle with direct access to streams deposited about 1.6 percent of the feces directly into the water. In New Zealand a study of a dairy herd (246 head) that was driven across a stream for

milking daily defecated 50 X more per meter while crossing the water than along the remainder of the lane where they were driven. The E coli measurements in the water after each crossing were elevated—peaking at 50,000 cfu/100 ml of water. Whitetail deer, likewise, lounge near the stream's edge or in the riparian areas and numerous other mammals and birds can be found in or near the water.

To the contrary, poultry litter is applied to the open fields and pastures with application guidelines of avoidance of riparian areas (100 foot buffer). The manure is spread allowing exposure to the sunlight which destroys most of the bacteria after hours to days. The drying process also renders bacteria nonviable.

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10. Affidavit of Gordon V. Johnson, Ph.D. In the State of Oklahoma's Motion for Preliminary Injunction.

11. Affidavit of Roger L. Olsen, Ph.D. In the State of Oklahoma's Motion for Preliminary Injunction.

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IV. QUALIFICATIONS

BIOGRAPHICAL SUMMARY
Of
BILLY R. CLAY
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American Board of Veterinary Toxicology

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Personal

Born in rural Eastern Oklahoma to agrarian parents on 23 October 1942
Married to Maria Elena
Children: Two sons Stepchildren: one daughter and one son

Education

Diplomate	American Board of Veterinary Toxicology and completed the course requirements for a Ph.D. in crop physiology at Oklahoma State University	1975
D.V.M.	Oklahoma State University	1970
M. S.	Agronomy, Oklahoma State University	1966
B. S.	Agronomy, Oklahoma State University	1964
H. S. Diploma	Liberty Mounds High School, Mounds, OK	1960

Special Expertise

- Animal/Plant/Soil Interactions with emphasis on water quality
- Nutritional and Toxicological relationships in animals
- Agricultural production with a focus on plant and animal health (predominantly beef cattle)
- Pharmaceutical development and Product Support

Employment/Work History

Veterinary, Environmental and Agronomic Consultant	1968-Present
Pharmacia/Upjohn Animal Health (now Pfizer) Technical Consultant	1977-2003
Smith Kline Animal Health Research Consultant	1973-1976
Oklahoma State University	
Adjunct Professor, College of Veterinary Medicine	1986-Present
Assistant Professor, College of Veterinary Medicine and The Oklahoma Agricultural Experiment Station	1970-1976
Instructor, Department of Anatomy, OSU CVM	1967-1970
National Science Foundation Graduate Assistant Fellow,	

Department of Agronomy	1965-1966
Undergraduate Teaching Assistant, Department of Agronomy	1964
Oklahoma Sorghum Testing Program, Field Supervisor	1962-1966
Meller Brothers Custom Harvesting	1961
Ennis Dairy Farm, Mounds, OK, Assistant Manager	1959-1960
Stanford Ranch and Turkey Poultry Farm, Bixby, OK	1956-1959

Experience Summary

- Farming, Ranching, Poultry, Swine and Sheep
- Dairying with employee supervision
- Experimental design, layout, culture and performance testing of sorghums, (including employee supervision)
- Agronomic research with sorghums, forages, peanuts and plant fungi
- Course design and teaching of agronomy, anatomy and toxicology courses to undergraduate, professional and graduate students
- Graduate student committees
- Diagnostic research and resolution of animal maladies
- Diagnostic service for veterinarians and the animal owning public
- Public speaking (professional and lay audiences)
- Research and development of animal pharmaceutical products
- Marketing and sale of veterinary pharmaceuticals
- Interaction and involvement with livestock and food commodity groups, including exportation
- International agricultural feasibility study of the Caribbean Common Market and the country of Belize
- County and State government; funding, administration of resources and maintenance of physical plant
- Case preparation, consultation and/or court testimony of litigated animal/plant/soil damage or loss disputes
- Forensic toxicology
- Oil and gas industry (mineral leasing, exploration, production, marketing and government regulations)
- Legislative liaison and lobbyist for the Oklahoma Veterinary Medical Association
- Corporate Board experience (Oil and gas, commodity exporting, retail food business, digital information management, hydrogen as an alternative fuel)

Honors and Awards

Undergraduate School

- Phi Eta Sigma Freshman Scholastic Honorary
- Schowalter Foundation Scholarship
- Consumers Cooperative Association Scholarship
- Alpha Zeta Agricultural Honorary Fraternity
- Phi Sigma Biological Science Honorary Fraternity
- Hi W. Staten Memorial Scholarship
- Ralston Purina Scholarship
- FarmHouse Fraternity, President
- Omicron Delta Kappa, All-University Men's Honorary
- Phi Kappa Phi Scholastic Honorary
- Who's Who on American Universities and Colleges
- Outstanding Senior Award in Alpha Zeta
- Outstanding Senior Award in Agronomy

- Top Ten Graduating Senior Award Oklahoma State University 1964

Graduate and Professional School

- National Science Foundation Teaching Fellow
- Board of Reagents Achievement Recognition
- Phi Zeta Honorary
- Student Chapter of AVMA; President and Convention Delegate
- Charter Delegate to the first National Student Conference to organize a National Association of Student Chapters of the AVMA
- Omega Tau Sigma, President

Professional

- Phi Zeta, President
- Honorary Lt. Governor State of Oklahoma
- Distinguished Teacher Award
- Who's Who in Veterinary Science and Medicine (two-time entry)
- Certificate of Appreciation from Payne County Officers Association
- Upjohn Distinguished Service award
- Pharmacia Achievement and Dedication Award
- Inc. 500 Individual Achievement, America's Fastest Growing Companies, Hideaway 2 Inc. #260, 1998
- Oklahoma Veterinary Technicians Association Certificate of Appreciation
- OSU College of Veterinary Medicine Distinguished Alumnus Award
- Elected to the AVMA Council on Public Health and Regulatory Veterinary Medicine
- Elected to the AVMA Animal Agriculture Liaison Committee
- Elected to the AVMA Committee on Environmental Issues
- Elected as the AVMA representative to the OIE (World Health Organization for Animals)
- Elected as the AVMA candidate to EPA Advisory Committee
- Oklahoma Veterinary Medical Association's Distinguished Service Award
- Oklahoma Veterinary Medical Association President's Award

Professional Society Memberships

- American Veterinary Medical Association
- American Academy of Veterinary and Comparative Toxicology, Fellow
- American Board of Veterinary Toxicology, Diplomate, Regent and Committee Chairman
- Academy of Veterinary Consultants
- American Association of Bovine Practitioners
- Oklahoma Veterinary Medical Association, Vice President, President-Elect, President, Manpower and Legislative Committees Chairman and past advertising manager for the JOVMA
- Council for Agricultural Science and Technology
- Plains Nutrition Council
- American Society of Agronomy
- Crop Science Society of America
- Soil Science Society of America
- Oklahoma Native Plant Society

Membership in Other Organizations and Activities

- Farm House Fraternity Alumni Board of Directors, Past Chairman and Current Chapter Advisor
- As a Veterinary Student Led the Establishment of a Self-Directed Honor Code for the OSU College of Veterinary Medicine Student Body
- As a Faculty Member Developed and Administered a Student Advisement System for the College of Veterinary Medicine Student Body and Faculty
- Served on the Planning Committee for the Establishment of a New Teaching Hospital for the OSU College of Veterinary Medicine
- Served as Chairman of the Planning Committee for the Development of a New Library for the OSU College of Veterinary Medicine
- Oklahoma State University Alumni Association, Past Director and Life Member
- OSU College of Veterinary Medicine Alumni Society, Class Representative and Past President (two terms)
- Oklahoma Animal Disease Diagnostic Laboratory Advisory Board, Past Chairman (three terms) and member of the selection committee for the Laboratory Director.
- OSU College of Veterinary Medicine Student Selection Group for 2002
- National Cattlemen's Beef Association
- Oklahoma Cattlemen's Association, Committee Member
- Texas Cattle Feeders Association.
- Plains Nutrition Council
- Past Advisor on research to Kansas State University's Department of Pathobiology
- Member of Council on Citizens Against Government Waste

Public and Private Endeavors

- Served on development, marketing and product support teams for MGA®, Lutalyse®, Naxcel®, Excenel®, Adspec®, Antirobe®, Mitaban®, Lincomix®, Albadry Plus®, Pirsue®, and Excede®
- County Government: Excise/Equalization Board, Past Chairman
  Board of Tax Roll Corrections, member
- ITAR Energy Corporation: Board of Directors and Treasurer (Mineral Holdings)
- Cimarron Valley Energy Corporation: Past Chairman, Board of Directors (Oil/Gas Production)
- American Agricultural Marketing Corporation: Past Chairman, Board of Directors (Agricultural Product Export)
- Hideaway 2 Inc.: Past Chairman, Board of Directors (Retail Pizza Chain)
- Pardalis, Inc.: Member, Board of Directors and consultant (Digital information management)
- Coastal Hydrogen, Inc.: Member, Board of Directors (Experimental production of hydrogen)
- Consultant for law firms, insurance companies, industrial firms, animal and land owners, etc. concerning property damages or losses

Publications and Presentations

Numerous publications have been authored but most are proprietary in nature.

Presentations have been delivered for a variety of audiences with professional continuing education as the typical format.

V. COURT CASES WITHIN THE PAST FOUR YEARS IN WHICH TESTIMIONY OR DEPOSITIONS WERE GIVEN

Chisholm Trail Agri-Services, LLC v. Eslabon Feeders, LP, et al. Case No. CJ-2002-429L In Dist. Ct. of Stephens County, OK.

Cecil Dougherty and Pete Glasscock v. LeMaster Livestock, Inc. and Eastern Livestock Co., LLC In US district Court Northern District of TX, Amarillo Division. CA No. 2-0-5CV-023J.

Clifford Simmons and Sharon Simmons v. TEPPCO Crude Pipeline, L.P. Case No. CJ-03-251. In Dist. Ct. of Caddo County, OK.

Mary E. Green, et al. v. Alpharma, Inc., et al. Case No. CV-2003-2150-2. In the Circuit Court of Washington County, Arkansas.

Billy Ray Mainer et al. v. Fairfax Elevator Co. et al. Circuit Court of Franklin County AR. Case No. CV-2005-22-1.

SIGNATURE BEFORE A NOTARY

STATE OF OKLAHOMA

County of Payne

Before me, the undersigned, a Notary Public, in and for said County and State, on this day of February 5, 2008, personally appeared Billy K. Clay to me known to be the identical person who executed the attached Affidavit for the defendants in the: Preliminary Injunction, State of Oklahoma, et al. v. Tyson Foods, Inc., et al., Case No. 05-CV-0329 GKF-SAJ. In the U.S. District Court, Northern District of Oklahoma.

Given under my hand and seal of office the day and year above written.

Lynda K. Muthersbaugh
Notary Public

My Commission Expires January 14, 2011
Commission # 03000852